

ABSTRACT

An adaptive and synergic fill welding method and apparatus enables automatic, or adaptive fill, and user directed, or synergic fill, modes to provide improved fusion quality, by ensuring that base metal dilution of a weld remains within a predetermined range. The apparatus
5 includes a means for profiling and tracking a joint, and multi-part adjustable welding means. In adaptive fill mode the method automatically varies a plurality of welding parameters in response to measured variations such as joint width between work pieces. In synergic fill mode, the method enables a user to vary multiple welding parameters in response to joint variations by adjusting a single variable, a synergic fill number, which may be controlled by means of a user
10 interface pendent. The multiple welding parameters may include predetermined wire feed speed, torch travel speed, welding voltage and current, torch oscillation width, dwell time, and a plurality of bead size parameters.